Werkkaart 2015-10 ÆE-00007(4)

(1) Los op vir x:

(a) $\frac{1}{2}(x + 3) = \frac{1}{3}(x - 1)$

$\frac{(x+3)}{2} = \frac{(x-1)}{3}$ KGV = 6

$\therefore 3(x+3) = 2(x-1)$

$3x + 9 = 2x - 2$

$3x - 2x = -2 - 9$

$x = -11$

(b) $-4 < \frac{-2(x+1)}{3} \leq 6$ KGV = 3

$\therefore -4 \times 3 < -2(x+1) \leq 6 \times 3$

$-12 < -2x - 2 \leq 18$

$-12 + 2 < -2x \leq 18 + 2$

$-10 < -2x \leq 20$

$\frac{-10}{-2} > \frac{-2x}{-2} \geq \frac{20}{-2}$

$5 > x \geq -10 \Rightarrow \therefore -10 \leq x < 5$

(c) $\frac{3}{2x-1} - \frac{4}{3-x} = \frac{7}{2x^2-7x+3}$

$\frac{3}{(2x-1)} - \frac{4}{(3-x)} = \frac{7}{(2x-1)(x-3)}$

$\frac{3}{(2x-1)} (-)(-) \frac{4}{(x-3)} = \frac{7}{(2x-1)(x-3)}$

{KGV = $(2x-1)(x-3) \rightarrow x \neq \frac{1}{2}$ of $x \neq 3$}

$\therefore 3(x-3) (+) 4(2x-1) = 7$

$3x - 9 + 8x - 4 = 7$

$11x - 13 = 7$

$11x = 20$

$x = \frac{20}{11}$

(d) $\left(x^{\frac{3}{4}} - 8\right)(9^{x-1} - 27) = 0$

$x^{\frac{3}{4}} - 8 = 0$ of $9^{x-1} - 27 = 0$

$x^{\frac{3}{4}} = 8$ $9^{x-1} = 27$

$x^{\frac{3}{4}} = 2^3$ $(3^2)^{x-1} = 3^3$

$\left(x^{\frac{3}{4}}\right)^{\frac{4}{3}} = \left(2^3\right)^{\frac{4}{3}}$ $3^{2x-2} = 3^3$

$x = 2^4$ GG $\Leftrightarrow$ GE

$x = 16$ $\therefore 2x - 2 = 3$

$2x = 5$

$x = \frac{5}{2}$

(e) $(3x + 4)^2 = 25$

$\sqrt{(3x+4)^2} = \pm\sqrt{25}$

$3x + 4 = \pm 5$

$\therefore 3x + 4 = 5$ of $3x + 4 = -5$

$3x = 5 - 4$ $3x = -5 - 4$

$3x = 1$ $3x = -9$

$x = \frac{1}{3}$ $x = \frac{-9}{3}$

$x = -3$

(f) $2 - (x - 2)(x + 2) = 4 - x^2$

$2 - (x^2 - 4) = 4 - x^2$

$2 - x^2 + 4 = 4 - x^2$

$-x^2 + 6 = 4 - x^2$

$-x^2 + x^2 = 4 - 6$

$0 = -2$???

Geen $\mathbb{R}$ - oplossing!

(g) $(x-5)^2(x+2) \leq 0$

$(x-5)^2 \geq 0 \quad \forall \quad x \in \mathbb{R}$

$\therefore \quad x+2 \leq 0$

$\therefore x \leq -2$

(h) $\frac{-3(2x-1)(5-x)(x+0,5)^2}{-3} = \frac{0}{-3}$

$\therefore (2x-1)(5-x)(x+0,5)^2 = 0$

$\therefore 2x-1=0 \quad$ of $\quad 5-x=0 \quad$ of $\quad \sqrt{(x+0,5)^2} = \sqrt{0}$

$x = \frac{1}{2} \qquad 5 = x \qquad \therefore x+0,5 = 0$

$\therefore x = -0,5$

(i) $x^{\frac{1}{2}} + 2x^{\frac{1}{4}} - 24 = 0$

$(x^{\frac{1}{4}} + 6)(x^{\frac{1}{4}} - 4) = 0$

$x^{\frac{1}{4}} + 6 = 0 \quad$ of $\quad x^{\frac{1}{4}} - 4 = 0$

$x^{\frac{1}{4}} = -6 \qquad x^{\frac{1}{4}} = 4$

$\downarrow \qquad (x^{\frac{1}{4}})^4 = (4)^4$

Geen $\mathbb{R}$-opl. $\qquad x = 256$

(j) $(x-p)^2 = (2x+q)^2$

$\sqrt{(x-p)^2} = \pm\sqrt{(2x+q)^2}$

$x-p = \pm(2x+q)$

$\therefore x-p = 2x+q \quad$ of $\quad x-p = -(2x+q)$

$-p-q = 2x-x \qquad x-p = -2x-q$

$-p-q = x \qquad x+2x = p-q$

$\therefore x = -p-q \qquad 3x = p-q$

$x = \frac{p-q}{3}$

(2) Los die volgende vergelykings gelyktydig op:

KGV=2: $\frac{x}{2} = 3 - \frac{x+y}{2}$ en $\frac{3x-y}{4} - \frac{x+y}{2} = -1$ KGV = 4

$\therefore x = 3\times 2 - (x+y)$

$x = 6 - x - y$

$x + x = 6 - y$

$2x = 6 - y \quad ---①$

Vervang ② in ①:

$\therefore 2(3y-4) = 6 - y$

$6y - 8 = 6 - y$

$6y + y = 6 + 8$

$7y = 14$

$y = \frac{14}{7}$

$y = 2$

en $3x - y - 2(x+y) = -1\times 4$

$3x - y - 2x - 2y = -4$

$x - 3y = -4$

$\therefore x = 3y - 4 \quad ---②$

$x = 3(2) - 4$

$= 6 - 4$

$x = 2$

$\therefore (2;2)$

(3) Maak i die onderwerp as $A = K(1 + i)^n$.

$A = K(1+i)^n$

$\frac{A}{K} = (1+i)^n$

$\therefore (1+i)^n = \frac{A}{K}$

$1 + i = \sqrt[n]{\frac{A}{K}}$

$i = \sqrt[n]{\frac{A}{K}} - 1$

(4) Bepaal $\frac{x}{y}$ as $20x^2 - xy - 12y^2 = 0$

5 × −4 = −16
4 × +3 = +15
−1

$20x^2 - 1xy - 12y^2 = 0$

$(5x - 4y)(4x + 3y) = 0$

$\therefore 5x - 4y = 0$ of $4x + 3y = 0$

$5x = 4y$ $\quad 4x = -3y$

$\frac{x}{y} = \frac{4}{5}$ $\quad \frac{x}{y} = -\frac{3}{4}$

(5) Bereken p en q as: $(2p - 3)^2 + (q + 6)^2 = 0$

$(\ )^2 + (\ )^2 = 0$ net vir $(0)^2 + (0)^2$

$\therefore 2p - 3 = 0$ en $q + 6 = 0$

$2p = 3$ $\quad q = -6$

$p = \frac{3}{2}$

(6) Twee trein vertrek 270 km van mekaar af. Na 3 ure ry hulle by mekaar verby. Bereken elke trein se spoed as die twee treine se spoed met 4 km/h verskil.

A = S x T (V/S, Gegee)

	A	= S x	T
Trein A	$3x$	x	3
Trein B	$3(x+4)$	$x+4$	3

V/S trein A ry x km/h

$\therefore$ trein B ry $(x+4)$ km/h

A ——— 270 km ——— B

$\therefore 3x + 3(x+4) = 270$

$3x + 3x + 12 = 270$

$6x = 270 - 12$

$6x = 258$

$x = 43$

$\therefore$ Trein A ry 43 km/h en Trein B 47 km/h